

Planning for the Environmental Impact of Distributed Generation

CEC DG CEQA Workshop

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Air Resources Board

Presentation Overview

- ◆ Potential Air Quality Issues
- ◆ Preliminary Estimates
- ◆ Next Steps
- ◆ Summary

Potential Air Quality Issues

- ◆ Impact on Annual Emissions Inventory
- ◆ Impact on Exposure Patterns
- ◆ Peak Shaving on Hot Summer Days
- ◆ Use of Emergency Standby or Exempt Units

Preliminary Estimates

- ◆ Impact on Annual Emissions Inventory

- DUA Study

- ¥Economics the Driver

- ¥Utility & Customer Perspective

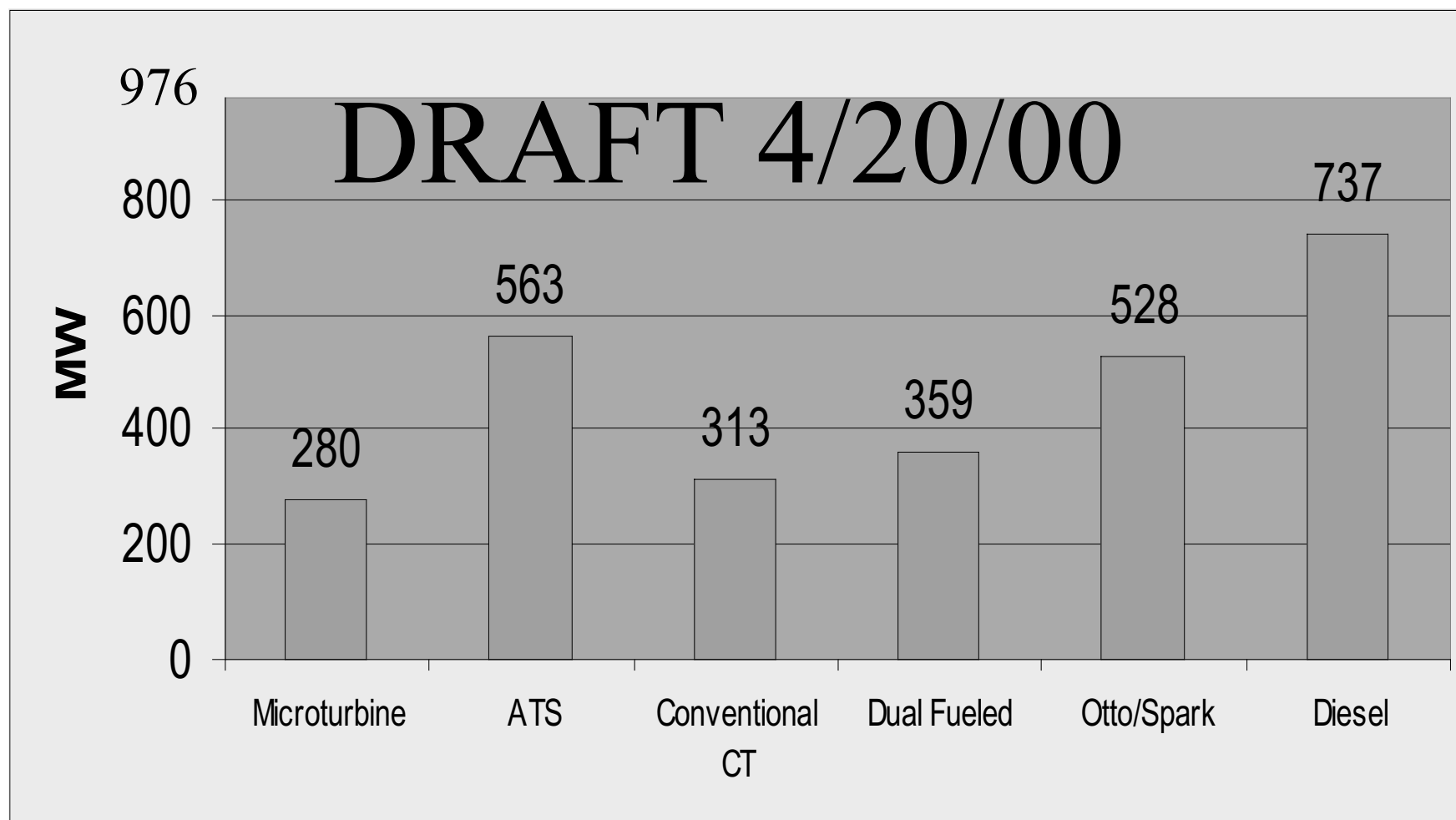
- ¥Utility Peak and Baseload Applications

- ¥Various DG Technologies

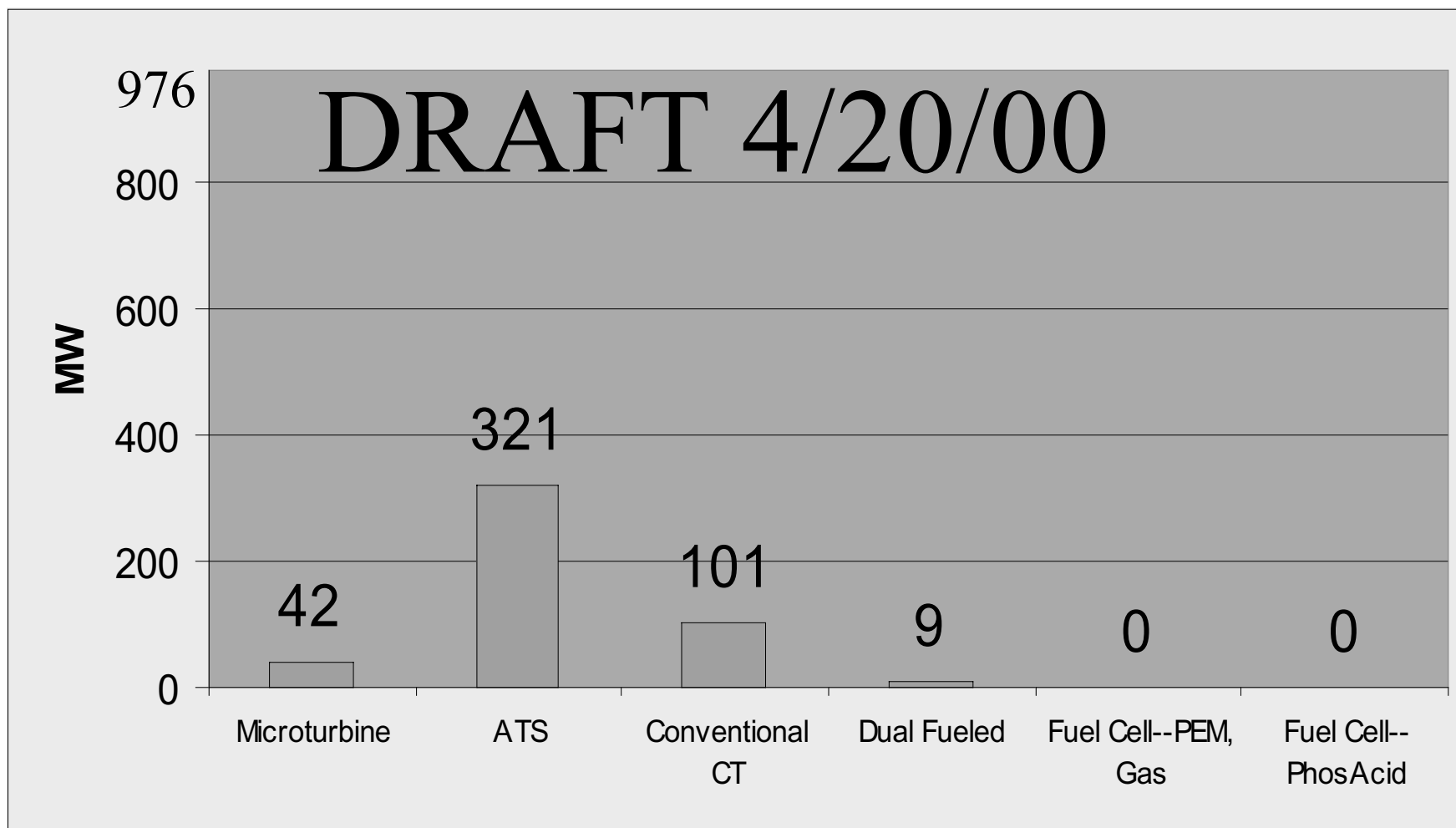
- ¥Eight Local Air Districts

- ¥Six Pollutants

2002 Market Potential Utility Peak Application



2002 Market Potential Utility Base Application



2002 Emissions Due to Cost-effective Utility Peak DG

2002 Peaking DG Option	Load Growth (MW/ yr): 976		Tons of Emissions (Thousand Tons CO2)	
	Portion of Growth	DRAFT 4/20/00		
		NOx	PM	CO2
System Only	100%	15	13	24
Microturbine	28.7%	52	12	58
ATS	57.7%	65	10	73
Conventional CT	32.1%	56	23	58
Dual Fueled Engine	36.8%	429	28	65
Otto/Spark Engine	54.1%	204	35	71
Diesel Engine	75.5%	1,466	261	152

2002 Emissions Due to Cost-effective Utility Base DG

2002	Load Growth (MW/ yr): 976		Tons of Emissions (Thousand Tons CO2)	
Baseload DG Option	Portion of Growth	DRAFT 4/20/00		
		NOx	PM	CO2
System Only	100%	368	312	571
Microturbine	4.4%	490	309	688
ATS	32.9%	1,040	271	1,233
Conventional CT	10.4%	681	392	835
Dual Fueled Engine	0.1%	395	313	573
Fuel Cell-PEM Gas	0.0%	368	312	571
Fuel Cell- Phos Acid	0.0%	368	312	571

2002 Bill Analysis--Low (PG&E)

DRAFT 4/20/00

Technology	Total B/C Ratio	Portion of Energy From DG	% Change Relative to Central Station		
			NOx	PM	CO2
Microturbine	.59	7.7%	+60%	-2%	+36%
Micro w/CHP	.79	67.1%	+267%	-50%	-78%
Diesel	.65	7.7%	+946%	+184%	+54%
ATS w/CHP	.72	35.7%	+134%	-27%	-17%
Gas Spark	.65	7.7%	+189%	+24%	+29%
Fuel Cell	.21	7.7%	-8%	-8%	+23%

2002 Bill Analysis--High (SDG&E)

DRAFT 4/20/00

Technology	Total B/C Ratio	Portion of Energy From DG	% Change Relative to Central Station		
			NOx	PM	CO2
Microturbine	1.29	44.5%	+346%	-12%	+210%
Micro w/CHP	1.47	100.0%	+398%	-74%	-117%
Diesel	.99	24.6%	+3,032%	+590%	+173%
ATS w/CHP	1.31	100.0%	+376%	-75%	-47%
Gas Spark	1.2	44.5%	+1,095%	+141%	+165%
Fuel Cell	.62	44.5%	-45%	-45%	+134%

Next Steps

- ◆ Continue to Investigate Potential Impacts
- ◆ Consult With Local Air Districts
- ◆ Participate in Upcoming CEQA Workshops
- ◆ Respond as Market Evolves

Summary

- ◆ Impacts Uncertain
- ◆ Preliminary Estimates
- ◆ Continue
 - Monitoring Proceedings
 - Research
 - Stakeholder Dialogue
- ◆ Respond as DG Market Evolves